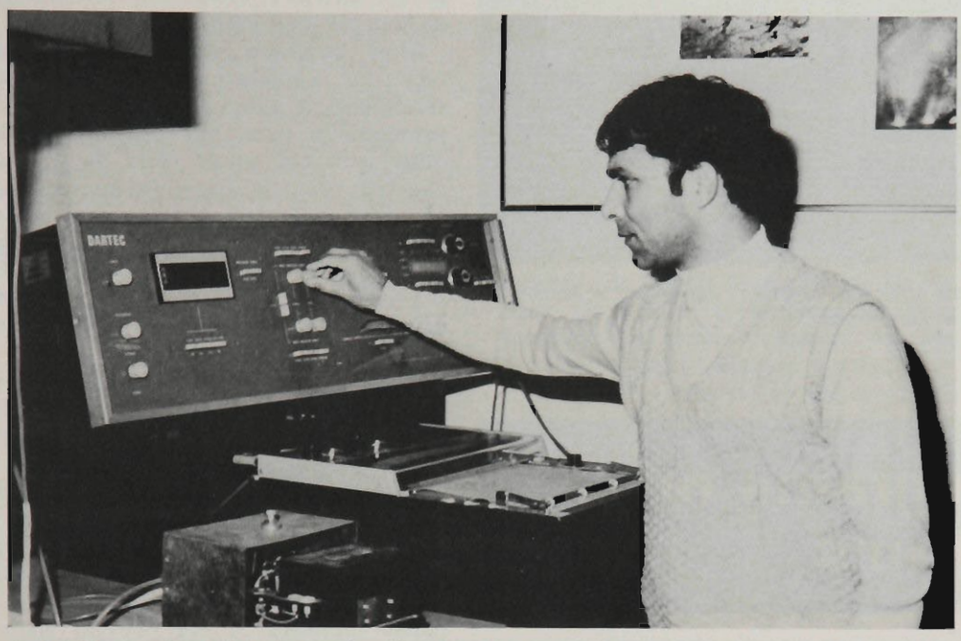
THE UNIVERSITY OF WOLLONGONG
GAZETTE

Vol. 1 No. 3 Spring 1983



One of the organisers of the international forum on HSLA steels — Dr Tara Chandra

Major international conference for Wollongong University

NEXT August, for the first time in its history, a major international conference will be held outside the US. It will be held at Wollongong University, to coincide with the sequicentenary celebrations of the city.

The conference will be sponsored by the American Institute of Mining, Metallurgical and Petroleum Engineers — the world's biggest metallurgical organisation, with a membership of four million.

Organisers are Dr T. Chandra and Dr D. P. Dunne, of the Department of Metallurgy in the University.

In the past decade several international conferences have been organised on the subject of high-strength low-alloy steels. These conferences have served to provide status reports on the current level of knowledge of the properties, structure and applications of this new generation of structural steels. The conferences have also provided stimulation for subsequent research on the development and application of HSLA steels and promoted international co-operation among scientists and engineers working in the field.

The first conference was held in Washington, DC, in 1975. This was followed by conferences in Cleveland and Pittsburg in 1976 and 1981 respectively. A fourth conference is being held in Philadelphia this year. And we have the next in Wollongong.

Principal aim of the conference is to provide an international forum for highlighting individual and national accomplishments in the overall field of development and applications of HSLA steels. Says Dr Chandra: 'the goal is to show where we stand at the time of the conference and to indicate where we go from there. If this complicated subject can be better understood, it can be better controlled; if it can be controlled, it can be applied commercially in the most severe test of understanding: the fusion of engineering theory with the complexities of commercial production and the hard facts of economic life. To succeed at such a formidable task would represent research and development at its finest.

'In the field of HSLA steels during the past decade major advances have taken place in the construction of bridges, ships, pressure vessels, pipelines and in motor vehicles. Many of these advances have been stimulated by the demands for higher yield strengths, for greater load-bearing capacity by lighter sections, good formability, a high degree of weldability and, of course, low cost. Research into achieving improved HSLA steels is currently taking place on a world scale, and the research will continue in the face of competition from other materials, scarcity of raw materials and energy shortages. High-strength low-alloy steels meet these challenges by offering an optimum balance of properties per cost.

'In the foreseeable future, the technology of micro-alloyed steels will be considerably influenced by man's ever-increasing demand for energy.'

It is fitting that such a conference should be held at Wollongong University. For Wollongong today, despite the depression, remains one of the largest steel-making centres in the southern hemisphere, and is located in an area which has the highest concentration of ferrous metallurgical industry in Australia. And of course the Department of Metallurgy at the University has an active research group currently working on the properties of the structures of HSLA steels.

What are these athletes doing? Find out on page 10 . . .

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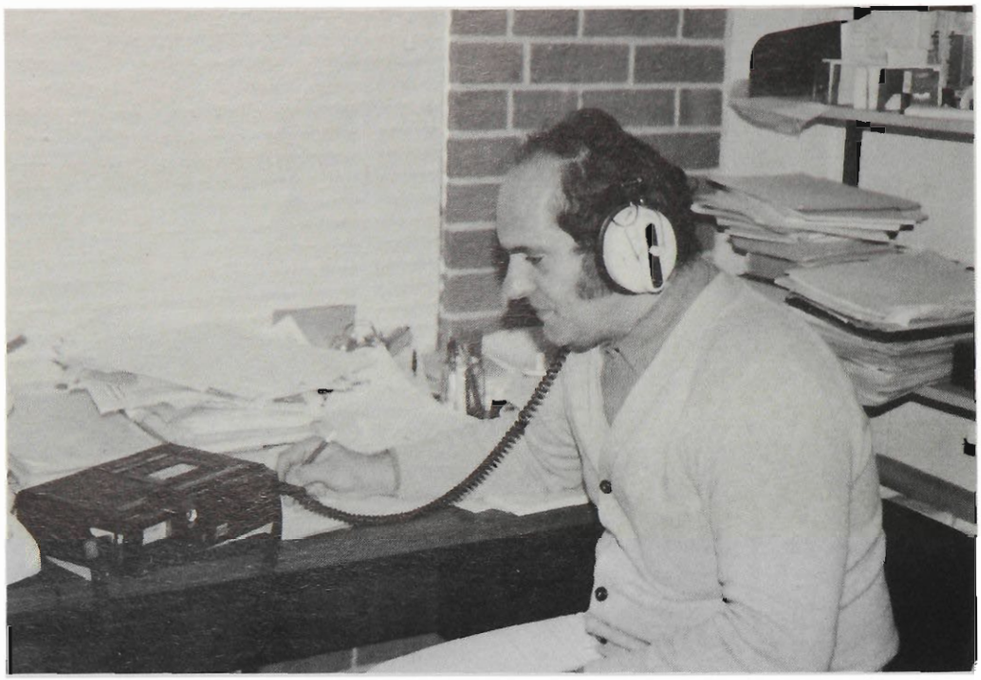


Expansion in broadcasting in Australia in languages other than English is the subject of research by Gaetano Rando, of the Department of European Languages

Clote radio programs on Australian stations

BROADCASTING in languages other than English (Clotes) has been around for quite some time — in fact, the first 'foreign language' program on Australian radio stations can be traced back to the 1930s. Until 1974, however, such programs were restricted to few languages — generally those which had communities large enough to generate advertising revenue — broadcasting for a relatively small number of hours on commercial radio stations. Further, until 1974, legislation required that all speech broadcast in a non-English language had to be accompanied by a word-for-word interpretation in English. Liberalisation of this requirement, the initiation of the Government-sponsored 'ethnic' radio service in Sydney and Melbourne and the introduction of public broadcasting have brought about a considerable expansion of broadcasting in languages other than English. Today, indeed, some 40 stations are providing 605 hours of broadcasting in Clotes in 34 different locations, although only four stations (2EA Sydney, 3EA Melbourne, 4EB Brisbane, 5EBI Adelaide) devote all or most of their air time to broadcasting in Clotes.

Very little is known, however, about the types of programs being produced or about the people who produce them. And it was to answer these questions that the research project on Multilingual Radio in Australia was undertaken by Mr Gaetano Rando of the Department of European Languages in The University of Wollongong. The project is funded by the University Research Committee.

A recently completed segment of the survey was carried out in South Australia where Clote programs are transmitted on four radio stations, two commercial (5AU Port Augusta and 5RM Renmark) and two public (5UV and 5EBI Adelaide), for a total of 80 hours per week. Of these, 5EBI, a public station licenced in 1978 specifically as an 'ethnic' station, accounts for 71 hours of programming languages other than English although this station also broadcasts programs mainly of a multicultural nature in English for a further 53.5 hours per week.

In all, 29 different languages are broadcast in South Australia, ranging from Italian and Greek (a total of 15.5 and 11.5 hours per week respectively) to languages spoken by numerically small 'ethnic' groups such as Estonian and Latvian (half an hour per week each).

Most programs are of a 'magazine type': viz, a mixture of news, music and entertainment, although the mix could vary substantially from one program to the other with pop music from the various countries being the item given most air time on most programmes. Languages whose communities feature a relatively large proportion of recent arrivals (such as the Vietnamese) tend to concentrate on the broadcast of information relating to Australia.

Apart from the case of 2EA and 3EA, broadcasters are involved in 'ethnic' programming work on a volunteer (unpaid) basis. Nearly all are first-generation migrants and represent a wide variety of socio-economic backgrounds, although it is interesting to note that the Greek and Serbian programming groups on 5EBI (5EBI broadcasters are elected at annual public meetings of the relevant speech community) are mainly composed of young people who were born in Australia and for whom the experience gained by working on the radio program has led to a proficiency in the use of their community language as well as to a greater knowledge of the culture of their parents' country of origin.

Representatives of the Embassy of the People's Republic of China in Australia have visited the University in response to an invitation extended by the Deputy Vice-Chancellor. The purpose of the visit was to establish cultural links between the University of Wollongong and educational institutions in the People's Republic of China. The representatives are pictured with staff of the Metallurgy Department. Left to right: Associate Professor Nick Standish, Mr Shen Zhengming, Third Secretary, Embassy of the People's Republic of China, Professor Geoffrey Brinson (Chairman of the Department of Metallurgy), Mr Li Shunxing, Second Secretary of the Embassy, and Associate Professor Noel Kennon.

GROWTH IN ACTIVITY

Progress in Research

AS a result of growth in the Research Grant Fund allocated to the University moves have been made to promote effective group research. The first steps have been taken by the establishment of Centres of Research Concentration. These centres represent, in effect, an umbrella organisation which will draw together groups of academics from various disciplines, who will carry out at least a significant part of their research within the program of the centre. Each centre will thus become an important focus for research work.

Announcing these moves, the Vice-Chancellor, Dr McKinnon, made the points that the University was quite clearly moving ahead in terms of its research activity, that the academic community was increasingly productive — not only in research but in developing structures within which research activities and capacities of staff could be most effectively used.

Among the allocation of research funds flowing from new research directions are: $40,000 for three years for a Centre for the Study of Technological and Social Change, to be co-ordinated by Professors Ron Johnson and Stephen Hill; and $40,000 for a Mining Research Centre, to be co-ordinated by Professor Lewis Schmidt. These two are the first to be established under the arrangements for Centres of Research Concentration.

Professors Johnston and Hill will be joined as co-ordinators of the Centre for Study of Technology and Social Change by ten associates: Professor Murray Wilson, Associate Prodessor Jim Hagan, Dr Jim Falk, Dr Damasa Marengo, Mr John Anderson, Mr Ray Markey, Dr Eveleen Richards, Dr John Schuster, Dr Margaret Campbell and Mr Mike Donaldson.

Professor Schmidt will be joined as co-ordinator of the Mining Research Centre by 11 associates: Associate Professor Bill Upfold, Dr Robin Chowdbury, Honorary Professor Alan Hargraves, Dr Max Lowrey, Dr Dennis Montgomery, Dr Naj Aziz, Dr Van U U Nguyen, Mr Peter Loveday, Dr Archie Johnston, Mr Yen Wen Wong, and Dr Richard Arenicz.

Both centres will develop and expand on research activities previously developed by individual staff in the groups and, particularly in the case of the Centre for Technology and Social Change, previous collaborative work. The Mining Research Centre will also develop the close working links already established with industry and with CSIRO Division of Geomechanics.

The decisions on which two centres should be approved was made on the advice of a special committee: the Vice-Chancellor; Professor Max Brennan, previously Chairman of the A.R.G.S.; Professor Ray Golding, Pro-Vice-Chancellor, University of NSW; and Professor Barry Leal.

Discussing the third of the grants, the CSIRO/University of Wollongong Collaborative research allocations, the Vice-Chancellor noted that the University was the only 'small' university to be included in the CSIRO arrangements, which was a cause for congratulation for those who had developed Wollongong's research reputation.

The $50,000 grant had been distributed between 11 projects. The leaders of the successful Wollongong groups were respectively, Dr Peter Arnold, Professor John Blake, Dr Peter Burton, Associate Professor Des Clarke, Professor Alan Cook, Dr Chris Cook, Dr John Ellis (two projects), Hon. Professor Alan Hargraves, Dr Van U U Nguyen, Dr Phil Simmons, some as co-leaders with others. The CSIRO Divisions associated in the research projects are: Building Research, Chemical Physics, Energy Chemistry, Energy Technology, Fossil Fuels, Geomechanics, Groundwater Research and Manufacturing Technology.

Seeking a way ahead

IT was perhaps salutary that on Friday July 22 — the day on which BHP announced the loss of $144.25m by its steel division — a conference organised by the Illawarra Industry Development Board was held on The University of Wollongong campus to examine the problems of the region. Theme of the conference was 'Let's all Work Together'.

In a foreword, the program stated that the role of the board is to 'Identify regional investment opportunities; attract new industrial and commercial projects to the region; encourage expansion of the region's established industries; plan and carry out strategies to achieve these aims'.

These, in fact, were the topics embraced by the seminar, at which representatives of management and trade unions discussed the problems of the steel and coal industries, of Port Kembla, of small-business development and tourism. The final session considered steps that might be taken to attract new industry.

It became clear during the seminar, however, that before the region can prove adductive to new industrial and commercial activity the malady of nihilism will require strong curative treatment.

At present, as outlined by Don Day, Minister for Industrial Development, in an opening address, vast sums are being fuelled into the region: examples were $115m for railway electrification; $146m for the coal loader; $40.2m for residential housing; $24.7m for dual carriageways on the F6 and F8; $14m for the construction of a multi-purpose repair berth; $9m for the construction of MSB workshops. There was more besides, including $37m put aside for road building and bridgeworks.

But, when all is said and done, there is no certainty that even funding of that magnitude will create long-term, lasting jobs in a region in which the current level of unemployment is 22,500 people, representing 16.2 per cent of the workforce.

The distressing problem of jobs was discussed at great length and underlined one factor above all else: that chronic, rather than poor, industrial relations, and what Don Day called parochial paranoia, and a sad lack of community support are paramount in the general malaise.

At the Illawarra Industry Development Board seminar are, from the left, Mr Bob Pearson, member of the University Council and Chairman of the Illawarra Regional Industries Board, Mr Don Day, Minister, Department of Industrial Development and Decentralisation, and Mr Eric Ramsay, MLA for Wollongong

The new Centre for Multicultural Studies is located in a cottage facing the university. Supporting the sign is Dr Ron Witton, head of the centre

Centre for Multicultural Studies

A Centre for Multicultural Studies has been set up by The University of Wollongong, to pursue action research and provide a teaching program concerned with multicultural Australian society and the role of ethnic minorities in our society. The Centre is to be expanded next year. Anyone interested in becoming involved in the courses or research program, are invited to contact the Centre. Especially sought are people whose own work has involved them in the multicultural dimensions of Australian society.

Master of Studies: This course has been developed to meet the need for a graduate-level course which will provide students with the necessary insights and skills for work in a multicultural context. The focus will be on such areas as education, social work, the workplace and trade-union organisation. It will consist of lectures, student-led seminars and practical training such as the formulation of research projects, video/film-making and curriculum development. The teaching program will be organised in four subject areas: a) Issues in Multicultural Research; b) Migration and Australia; c) Multiculturalism, Social Policy and Social Welfare; d) Multiculturalism, the Family and the Education System.

Some variation to provide access to other courses in the University is also permitted. The Master of Studies course may be taken part-time over two years, or full-time over one year; applicants should normally hold a pass degree or equivalent.

M.A. and Ph.D.: The Centre will be able to provide supervision for students wishing to register for an M.A. or Ph.D. research degree either within the Centre itself of by means of joint supervision with other Departments or Schools of the University. The main current areas of interest within the Centre are:

Multicultural Education (with special interest in adult education)
Workplace Issues (unionisation in a multi-lingual workforce, occupational health and workers' compensation)
Ethnicity, Class and Gender
Ethnicity and Social Welfare

The normal entry qualification for the Masters degree is an honours degree or equivalent. Those with only a pass degree would enrol initially in a M.A. qualifying program. For the degree of Ph.D., a good honours degree is required. Financial support may be available through post-graduate scholarship awards, part-time teaching and/or employment in research projects being carried out by the Centre.

In addition to inviting applications for the teaching program outlined, the Centre is keen to contact people who want to carry out specific research projects, make video/films or radio programs or who are interested in literary activities such as poetry, fiction or play-writing that relate to the Centre's activities and interests.

The Centre is interested in using its resources to help individuals or organisations in applying for funding for such projects. It can also help develop such projects by providing access to the Centre's information and technical resources. These include secretarial facilities, office space and equipment, a research library as well as a full range of audio-visual equipment. The Centre, housed in a building of its own, aims to provide a supportive atmosphere where constructive and useful studies in the multicultural dimension of Australian society will be co-operatively carried out by staff, students and visiting Fellows.

To make contact, phone (042) 282 401 — reverse charges, if necessary — or write to any of the following: Debra McLoskey, Michael Morrissey, Ron Stewart, Ron Witton, Centre for Multicultural Studies, University of Wollongong, P. O. Box 1144, Wollongong 2500 NSW. or visit the Centre at 53 Northfields Avenue, North Wollongong.

The Irish from County Clare researched

IT is a widely known fact that Irish are among the world's great travellers. Go wherever you may you find Irish men and women who have fled the Emerald Isle to escape from its poverty, its politics, or simply to see what lies on the other side of the hill — or ocean. And that generalisation holds equally true for the people of County Clare, which lies wedged between Limerick and Tipperary, with Galway to the north and the bleak Atlantic to the west.

And now a vast storehouse of information on the people of County Clare — 6,308 of them who made the three and a half months, 13,000 miles voyage to settle under the Southern Cross — has been collated over the past three or four years by a research student in the University. Richard Reid, working in the Department of History, has donated to the Clare Heritage Centre at Corofin a volume containing print-outs of the details of the Claire immigrants listed in his research.

The data has been stored in the university computer in a program developed by Steve Harrison, the Social Science Programmer.

Reid's work details information on a total of 45,000 Irish expatriates in the Southern Hemisphere. The section on Clare includes an alphabetical index containing surname, Christian name, age, birthplace in Clare, name of ship, and date of arrival in Sydney.

Also listed are ships — 250 of them — engaged in the trade, and records alphabetically all Clare people on each ship.

Reid has taken a year's leave from the University and is working at present as an education officer in the War Memorial, Canberra.

Equality of Opportunity

by the Vice-Chancellor

MEMBERS of the university community are sometimes puzzled about the emphasis currently given to equality of opportunity. Some are inclined to dismiss it as simply a political response to the lobby for women's rights — or reject it even more strongly as emanating from the 'feminists'.

Many of these are civilised, decent human beings, resentful of any suggestion that they are liable to treat people other than as equals. They reject the notion that it is possible to have inequalities arising from habits of thought which make (perhaps mistaken) assumptions about the way things ought to be. But unless we value all human beings sufficiently highly certain groups in the community will inevitably have less than equal opportunity with others.

In universities, as elsewhere, the most obvious inequalities relate to gender, class and ethnicity. Women form a very small proportion of the senior academic or general staff of universities. Students from low-income families are much less well represented than those from high-income families. Children of migrant parents provide fewer enrolments than their numbers in the community might suggest.

It is true that for students the situation is changing. Between 1971 and 1981 there was a marked increase in the proportion of girls enrolling in the professions, such as medicine (29 per cent to 40 per cent), law (17 per cent to 37 per cent) and veterinary science (16 per cent to 42 per cent), although the rise in female enrolments in engineering was very low (1 per cent to 5 per cent).

The numbers going on to higher degrees however continues to show a marked preponderance of males. And women in the tutorial and lecturing ranks are few indeed at the professorial level.

For the university the problem is how this inequality among the sexes may be redressed. But there is surely no earthly reason why homemaking should be women's sole responsibility, or that women should be denied opportunity because of the homemaking tradition.

No one in the university is pressing for any departure from the principle of selection on merit. In this university the basis of academic selection will continue to be the merit principle. On the other hand, action to exclude positive discrimination in staffing can and should be undertaken by the university.

One way might be to give people broader experience in the selection process through participation in selection and promotion committees. A key objective could be to assist academic staff to advance their careers by ensuring that they can make a full contribution not only to teaching but also in research work. Child care and other allied measures are also desirable.

Another avenue is to raise the consciousness of the academic community about the need for more equal representation, so leading to questioning, by individuals, of their own discriminatory attitudes; and by examination, by the university, of the ways in which it finds good applicants. It should be stressed that wide training and developmental activities should be open to all staff — male and female. And that affirmative action of the kind outlined for women should be paralleled for minority groups in general.

Governments are promoting equality of opportunity through legislative and administrative means. Some are pressing that governments should include universities in the schedule of institutions legislatively required to meet particular targets for the provision of equal opportunities. So far governments have been willing to allow universities to take the initiative.

The moral imperative toward action is clear. We ought to be keen — even determined — to be a model of a just and democratic community.

Ken McKinnon

Early enrichment in maths for school students

A program organised by the staff of The University of Wollongong in conjunction with the NSW Department of Education is proving highly popular with talented maths students from South Coast secondary schools. The University is offering what is termed a continuing program of enrichment work in mathematics. And the program is attracting students from schools from many districts in the region — even, for example, from Chevalier College at Bowral in the Southern Highlands.

The program was initiated in 1982 by John Blake, Professor of Mathematics, and since then has been co-administered by Dr Martin Bunder and Dr Graham Winley.

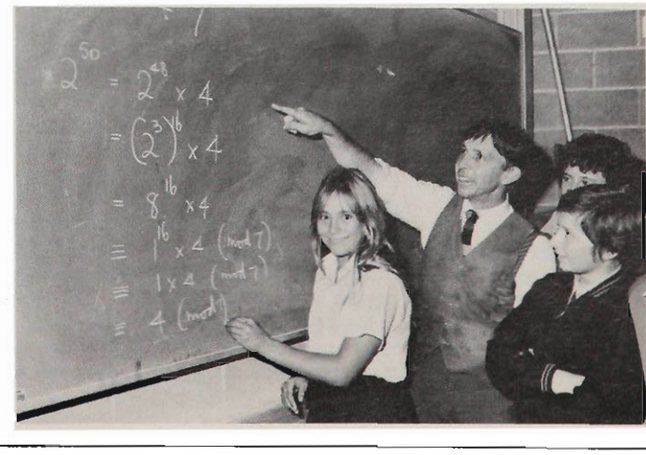
Students are invited to the University first of all for an Enrichment Day, designed to introduce them to what might be called 'university life.' They are invited in three groups: from years 7 and 8, years 9 and 10, and years 11 and 12. Those accepting the invitation first spend a complete day at the University and thereafter attend three times during the school term, from 4.30 to 6.30 pm — outside school hours.

Speakers at the sessions are drawn from the Mathematics Department Faculty, from the Institute staff and include also high-school masters.

Numbers of students, as is only to be expected, vary because of school commitments and other pressures, which are of course greatest for students approaching the HSC. But a measure of the level of interest may be gauged from the fact that numbers in the years 7 and 8 group are in the lower seventies and in the years 9 and 10 group between 30 and 40. Parental support is clearly very strong.

Final session for the 1983 academic year was held on August 1.

For information on future enrichment work in mathematics telephone Dr M. W. Bunder on (042) 20 2871.



Pictured with a group of bright maths students during an Enrichment Day session is Mr George Cole of Wollongong High School (Illawarra Mercury picture)

Development of advanced testing facility aids ductility research

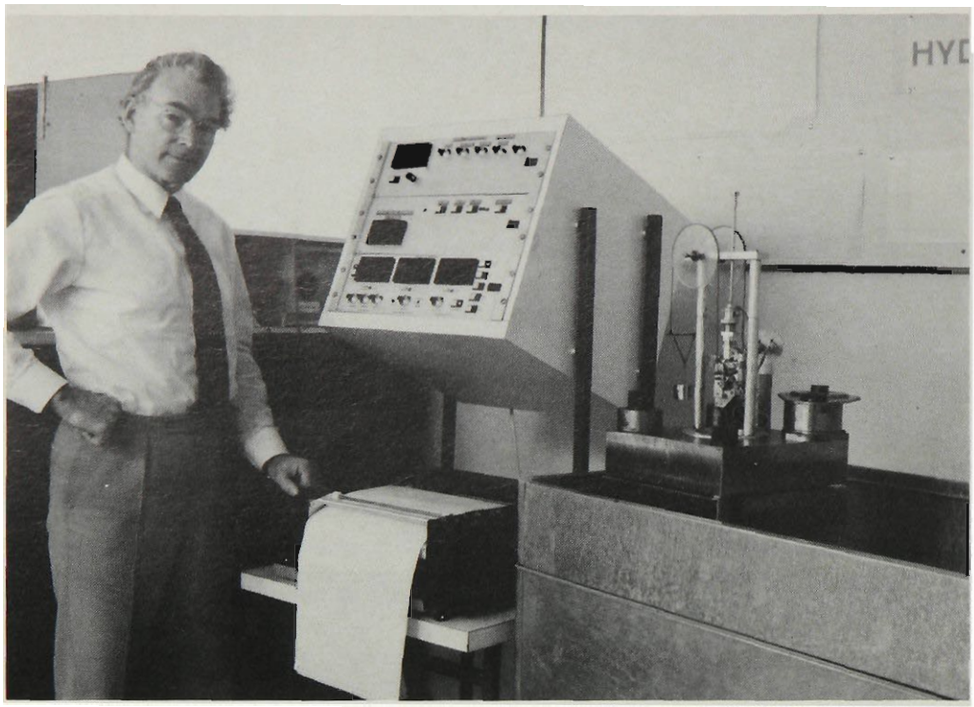


Fig 1: the new apparatus with the author of this article, Mr Malcolm Atkinson, on the left

One of the most important characteristics of a metal is its capacity for deformation without cracking. Although many materials can be deformed when hot, metals can be plastically strained at low temperature too. Indeed, they normally become slightly stronger when strained cold. This phenomenon, known as 'strain hardening', makes them amenable to being shaped by tension forces: because they actually become stronger as they are stretched — even though stretching is accompanied by thinning — and resist thinning faster in one place than another; so the deformation is uniform. Such materials are said to be 'ductile'.

Many manufacturing processes are centred on the shaping of ductile metals by tensile, or drawing, forces and a wide range of industrial and consumer goods is produced in this way: wire, tubes, motor vehicles, kitchen sinks, and so on. The intrinsic ductility of metals and alloys also makes them suitable to carry tension and bending loads in engineering structures. Bridges, cranes, building frames, spanners and paper clips, for example, are all protected (mostly! — but that's another story) from sudden collapse by the ability of metals to yield plastically without losing strength.

Ductility is often cited as a characteristic property of a metal, which in a general way it is, but in fact ductility is a complex attribute conferred by a set of more basic properties. The most important of these are resistance to fracture, propensity for strain hardening and, especially for sheet metals, anisotropy (i.e., the variation of strength with direction). These mechanical properties are, in turn, conferred by fundamental physical properties of the metal crystal, modified by composition and other microstructural variations. Naturally, this is a well-studied subject but the control of ductility remains problematical and this interface between metal producer and manufacturing engineer is still a busy research field for 'mechanical metallurgists'.

There are three major sources of difficulty which attract the attention of most investigators sooner or later: the complexity of the strain hardening response, the dependence of ductility on the mode of deformation and the uncertainty of recognising those microstructural features of the metal which govern its current strain hardening rate.

The first two of these were judged to be most urgent when research on this topic began in the Department of Metallurgy in the University of Wollongong some fifteen years ago; because, if the plastic behaviour could not be completely and accurately described, it seemed unlikely that reliable correlations with the constitution of the metal could be obtained. The experimental work was therefore directed towards securing precise measurements of plastic behaviour at controlled straining rates for both simple (uniaxial) stretching and biaxial stretching conditions. This objective led, through many aspects and stages of development, to construction of an advanced hydraulic bulging test facility for sheet metals.

The hydraulic bulging process is a convenient method for testing the plastic behaviour of sheet metal in biaxial tension without frictional or other major constraints. This condition of biaxial tension may sustain a very large uniform strain corresponding to doubling the surface area (or halving the thickness) of the sheet, which is commensurate with strains commonly induced by press forming.

The bulging test procedure calls for an initially flat sheet specimen, usually about 200 mm diameter, which is firmly clamped around the edge and then stretched by lateral fluid pressure into a nearly hemispherical shape. Strictly speaking the change of shape is three-dimensional but, if the sheet material is thin and the radius of the bulge curvature is large, the stretching may be viewed locally as two-dimensional and the process is regarded as giving the best approximation to 'uniform deformation under biaxial stress'.

In principle, the strain (deformation intensity) and the stress (force intensity) in the metal can be evaluated from measurements of the bulged surface and of the hydraulic pressure. Thus the relationship between current flow stress and strain — the essential description of plastic behaviour — may be determined for a much larger range of strain than can be observed in the common uniaxial tensile test.

The original form of the hydraulic bulging test, as first described by Jovignot in the mid-thirties, seems to have been introduced simply as a test of 'stretchability': an aspect of sheet-metal ductility perceived as essentially different from 'drawability', which is the capacity for shaping by drawing through a die. The pressures of World War II, however, motivated extensive research in connection with forming skin panels for aircraft and into the effects of underwater explosions. This research surfaced in a series of theoretical papers in the late 1940s, but interest in the bulging test method lapsed after the war, even though new ways of assessing formability were keenly sought after. No doubt the combination of a failure to make useful new discriminations of ductility from simple bulge height measurements, the lack of a simple measuring instrument and the prospect of forbidding mathematical analysis discouraged its general adoption. Nevertheless the stage was being set for the bulging test to assume an indispensible role in the investigation of ductility.

Until 1950, anisotropy of a metal sheet was assumed to be detrimental to its press formability, causing uneven flow through the forming die and production of mis-shapen articles. But then it was recognised that plastic anisotropy could be beneficial for some pressings. Ten years later it was shown that the generally superior deep-drawing performance of low-carbon steel over most other metals could be attributed to the relatively high strength of such steel sheet in the through-thickness direction. Unfortunately it is difficult to measure the through-thickness strength of a thin sheet directly and accurately: it must be calculated from its effect on the strength of the sheet in biaxial tension, which is the way it shows up in deep drawing.

The fact that plastic anisotropy could not be properly measured in deep-drawing tests served to heighten the desirability of the bulging process as a regular testing method. It had long been known that the flow stress in hydraulic bulging is affected by anisotropy of the metal sheet but, while the test procedures and interpretation remained cumbersome, information was generated only slowly by the few specialist investigators proceeding at the pace their resources allowed.

A significant advance in bulging test apparatus was made in the mid-sixties at the University of Manchester where a simple, inexpensive bulging system complete with a robust instument for measuring surface expansion and radius of bulge curvature was designed. This apparatus, together with a simplified strain analysis supported by their graphical aids to quick solutions, enabled a stress-strain relationship for deformation in biaxial tension to be determined as a routine laboratory operation.

Stimulated by the success of this apparatus, the hydraulic bulging test enjoyed a brief period of acceptance before interest lapsed once again: confidence was undermined by the discovery that this relatively painstaking procedure did not always give results compatible with those of the more established tests or with pressing perfor-

mance. The practitioners and the scientists were faced with yet another level of intricacy. However, much real progress had been made in broadcasting the essential complexity of ductile behaviour: the need for detailed analysis and more elaborate testing methods would in future be more readily appreciated.

Meanwhile the focus of attention in ductility research was swinging back to strain hardening behaviour. After some years of electron microscopy, changes in the microstructure of a metal accompanying its deformation were fairly well documented but, for strains greater than a few per cent elongation, quantitative correlations between flow stress and microstructure were lacking. Furthermore there was mounting evidence that the strain hardening behaviour of many common metals might change after only ten or twenty per cent elongation. However, since the conventional (uniaxial) tensile test cannot sustain much more uniform elongation than this, an irrefutable demonstration of the putative two-stage strain hardening behaviour was often elusive.

Further development of the hydraulic bulging test into a high-precision biaxial stress testing method appeared to be the only real hope of resolving the several problems evident at the end of the 'sixties.

The investigation of the bulging test in the Department of Metallurgy began with an examination of straining rate variation, since it was known that the plastic flow stress of a metal is often sensitive to the rate of deformation and that straining rate control in the bulging test is difficult. Calculation showed that if oil is supplied to the bulging chamber at a constant rate then the straining rate at the centre of the metal diaphragm could be expected to increase a hundredfold during the test. This fact seemed to explain some of the peculiarities of reported test results. No simple solution to this problem could be found however, so it was decided to construct a closed-loop servo-controlled bulging system which would monitor the straining rate and hold it constant.

In 1971 the Department acquired an electronically controlled servo-hydraulic metals-testing machine. This made possible a relatively simple modification of the bulging apparatus to servo control. The instruments were converted to give electrical signals and the bulging chamber was coupled to the testing machine through a slave hydraulic cylinder. Bulging tests could then be performed at constant straining rate. This apparatus, which was demonstrated at the Australian Institute of Metals Annual Conference held in Wollongong in 1973, yielded much more consistent and credible test data but revealed a need for improved measurements. A new high-precision bulge-measuring instrument was therefore designed and built to meet the fine tolerances necessary for closed-loop servo control. It was also designed to operate with only light contact pressure, so preventing specimen damage. In fact, tinplate only 0.3 mm thick can be tested satisfactorily.

It was now time to look more closely at analytical methods for evaluating stress and strain, for it was observed that there was often a significant error in the predicted metal thickness at the centre of the bulge. The many published papers dealing with the mechanics of the bulging process showed that strains could be calculated in detail provided the plastic properties of the metal were already defined, but left open the question of determining an accurate representative strain at the centre of the bulge when the properties of the metal are unknown. Careful measurements confirmed that the variation of thickness near the centre of the bulge could not be ignored and that the relationship between the measured dimensions and the representative strain at the centre varied with the thickness of the metal sheet.

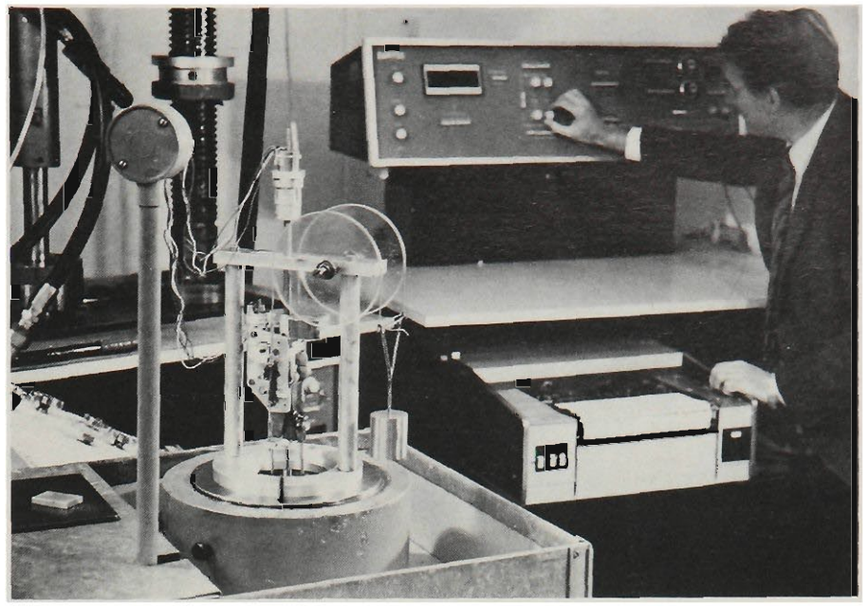


Fig 2: the bulging test apparatus in the form in which it was in use in the mid 1970s

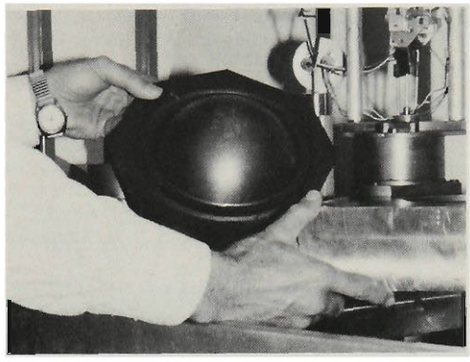


Fig 3: a bulged specimen of hot-rolled steel being removed from the bulging chamber

These findings showed that the usual simple approximate description of the strain would not suffice and carried the further implication of error in the calculation of stress. Eventually explicit solutions for the representative stress and strain at the centre of the bulge, taking into account all these factors, were formulated and the modern hydraulic bulging test method emerged. Fig 2 shows the bulging apparatus as it was in use in 1976.

Completion of the servo-hydraulic bulging test facility allowed the plastic behaviour of various ductile metals to be studied over the extended strain range sustained by biaxial tension. The new information obtained in this way afforded a clearer perception of strain hardening which proved to be of immense value in determining how the analysis of plastic stress-strain data should be approached.

These complementary research strands, the quest for an improved method of revealing plastic behaviour and the inquiry into the nature of that behaviour, have since been followed jointly with the overall aim of resolving more detail in our understanding of plastic properties. Thus a conjecture in the analysis demanded improved accuracy of the test data and greater precision raised confidence in the discrimination of events; and this tumbling interaction generated the necessary broad experience to guide the next steps.

As far as the bulging test is concerned the next steps in this research project were attention to the fine calibration of the measuring and recording instruments and to extending the range of controllable straining rate. However, at about this time there was a growing interest in new strong formable sheet steels which were being produced in thicknesses beyond the capacity of the existing bulging chamber. The bulging die for these stronger materials would need to have an aperture of 150 mm diameter and to withstand a force of nearly 100 tonnes, so it would be a substantial piece of metal: rather too much for repeated lifting.

These design considerations added up to a specification for a major programme of further development, and it was decided that this would best be achieved by building a completely new machine. Fig 1 shows this new apparatus with larger bulging chamber and improved control system.

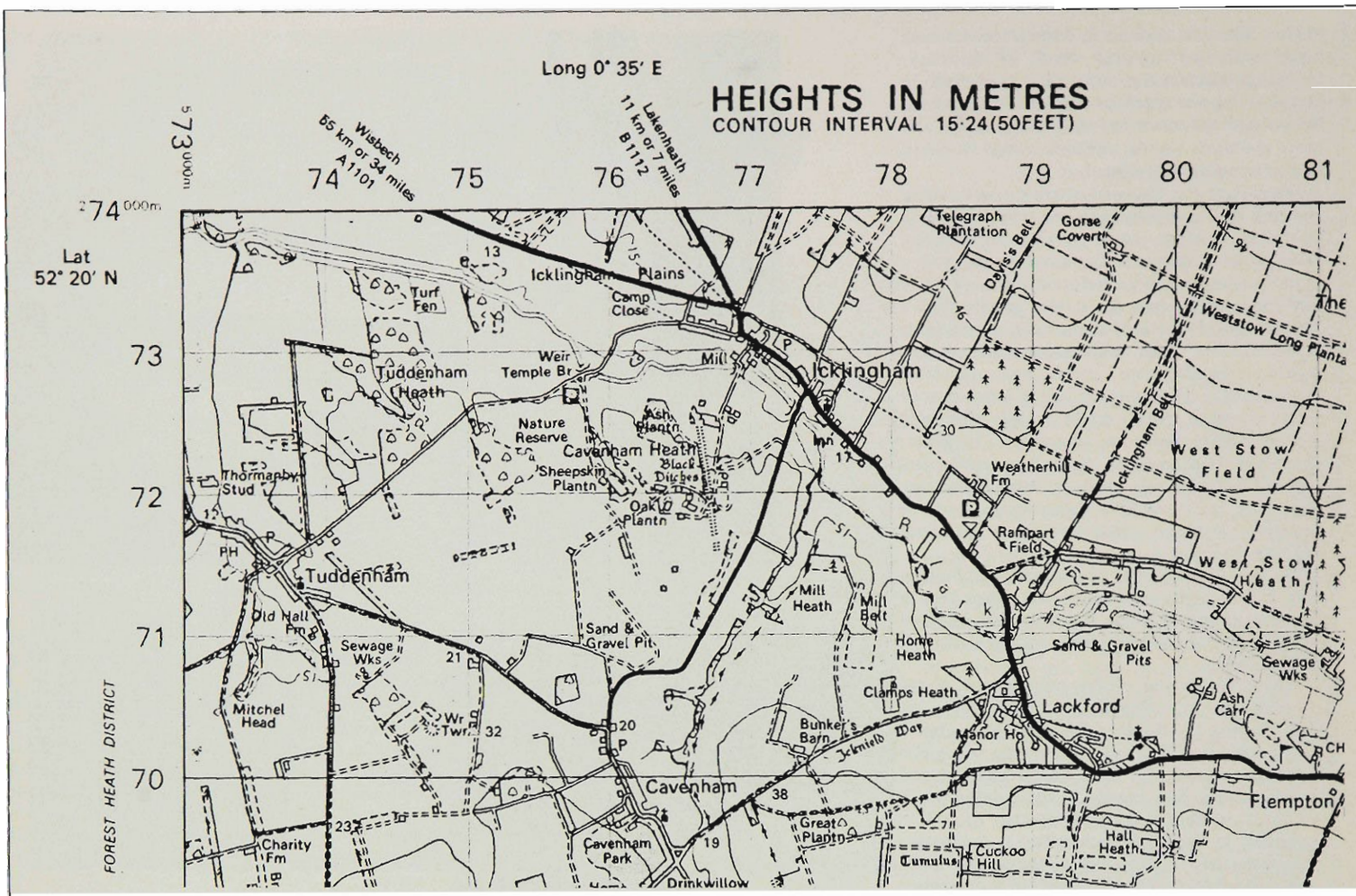
The modern servo-controlled hydraulic bulging test for sheet metals appears to herald the last major step in the progression towards complete understanding of ductility. Early versions of the test revealed little about the basic mechanical properties of the material under test because the necessary techniques for measurement, control and analysis were not generally available or practicable. These problems have been overcome by utilising modern hydraulic and electronic equipment to produce a powerful routine test facility — which is leading to improved knowledge of plastic behaviour.

In the context of the current industrial revolution — the drive to replace craft skills by complete calculation and control of the conditions necessary for trouble-free production — the newfound ability to measure the variation of flow stress and strain hardening rate under conditions encountered in press forming is timely. For, in the computer age, the whole forming process will be modelled mathematically at the design stage; and the model must include an exact definition of the plastic properties of the metal to be formed. The ability to observe plastic behaviour under biaxial stress will greatly assist this development and it is noteworthy that major sheet-metal producers and press-shop operators overseas are taking a keen interest in servo controlled bulging tests.

Acknowledgements

This work has been supported by John Lysaghts (Aust) who purchased the initial bulging apparatus for the Department of Metallurgy in 1970, by A.R.G.S. (which funded the conversion to servo-hydraulic operation in 1972, the completion of the new machine in 1982, and a research assistant during 1983) and by A.I.S., Austral Crane and Alcan, who have provided construction material and/or materials to test.

Malcolm Atkinson
Department of Metallurgy
The University of Wollongong



Domesday forms of place-names are shown on the map. Tuddenham has evolved from Todeham, Totenham, Todenham; Cavenham from Kanauaham; and Icklingham from Ecclingaham

Tracing the origin of place-names in England

AN elderly Australian shopkeeper, when asked why the nearby creek was called Piano Box Creek, replied that it was because there was once a piano box in it, and that he knew whose piano box it was, too. Perhaps he did; and that settles the matter of the origin of this place-name.

In England, however, where place-names are usually very old, often predating any written let alone oral record, establishing the original meaning of a place-name is quite another matter. A place-name can also be a vital clue to early settlement of an area, and to the language of its inhabitants, so that recovery of early forms and their meanings is a study vital to several disciplines.

Of course everyone has a pet theory, especially if he lives in Nether Wallop, or Great Snoring, but pet theories are usually wildly abberant, and patient research is necessary to establish supportable hypotheses. Ms D. M. E. Gillam and Mr R. W. J. McConchie of the Department of English Language in the University are currently working through the evidence of names in the Lackford Hundred of Suffolk, (an ancient administrative division) and will be tackling the remaining 7½ hundreds constituting the Liberty of St Edmunds, based on the ancient area of control of the Abbey at Bury St Edmunds.

Appearances can be deceptive. Take, for instance, the name of the village of Lakenheath in this Hundred. Surely, you would conclude, this name has to do with a heathland, and looking around the area you would quickly note the low sandy hill to the north which would fit the bill nicely. You might then go on to speculate that the Laken- part was some sort of adjective.

An examination of early written sources, going back to the tenth century, would reveal that your speculation was ill-founded. Early forms are usually *Lacingahethe,* and the second element derives from an Old English word meaning 'a landing place'. The first element means either 'of Lāc's people', or 'the people of the lake, or sea'. But the nearest expanse of water is The Wash, 25 miles away.

Still more research illuminates this apparent inconsistency. Lakenheath was once on the very edge of the vast waterway of the Fens, now drained, and could indeed have been a landing place for boats. However, the sand on the hill is deceptive — it blew there in the 17th century in a series of sandstorms, probably created by fen drainage, which actually buried the nearby village of Santon Downham.

Place-name research then requires the patient accumulation of information from a multiplicity of sources, often unpublished. These include not only major national records such as the Domesday Book (c.1086), the Hundred Rolls and Feudal Aids (13th and 14th centuries), and records of Parliamentary Enclosures, but also charters, wills, and various private documents, glebe terriers, manorial extents, maps, and court records. These records may be in older forms of English, medieval Latin, or Anglo-Norman, and may be still in private hands and largely uncatalogued, though many are now in Record Offices.

The evidence of archaeology can also be important. In the case of Lakenheath, the name itself is Old English (C5 or later) but there is Roman occupation near the village. At nearby Icklingham the situation is more complicated since although the name looks to be Old English, the first element could well contain the form icen- which might link it to the *Iceni* a celtic group known to inhabit the area, and whose still-famous queen Boudicca, led a revolt against the occupying Romans in 60 BC. It is necessary to resort to complex linguistic evidence to resolve such problems.

The early period of English history is, surprisingly, still very obscure. The results of place-name research form an invaluable resource for other scholars, such as historians, archaeologists and linguists working in this field. Place-names provide a means of unravelling some of the complex problems posed by the superimposition of millenia of human settlement and a key to patterns of ancient social organisation.

Major international award for University's Ross Robinson

DR Ross Robinson, Reader, Department of Geography, has been notified of the award of second prize, worth $1500, in an international essay competition sponsored by the Rotterdam Port Industries Association on the occasion of its 75th anniversary.

Dr Robinson's essay was entitled 'The impact of industrialisation in developing countries on port functions' and drew on his experience over five years with the UN Economic and Social Commission for Asia and the Pacific in Bangkok and his earlier experience with the United Nations Conference on Trade and Development in Geneva. The essay represents part of a continuing interest in the problems of port development in developing countries.

The Rotterdam Port Industries Association is of course the association of Rotterdam port industries and port operating companies in the transport and cargo handling area. It is also the port employers' organisation. As a private institution it includes 250 companies and 12 branch organisations.

General theme for the essay was 'The future of the major seaports in the next 25 years'. The competition was open to staff and students of all universities, employees of port authorities, port industries, ministries, institutions of transport, traffic and commerce.

The judging panel consisted of three recognised authorities — a Professor of Transport Systems and Materials Handling from the Delft University of Technology, Holland; a Professor of Marketing at the Erasmus University, Rotterdam, and a member of the Scientific Council for Government Policy; and a Professor of Civil Engineering at the Massachusetts Institute of Technology in the USA.

Some notes from Dr Robinson's conclusions:

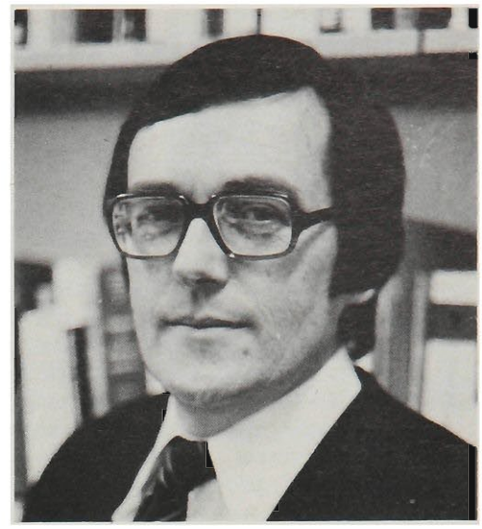
'What will be the likely impact of industrialisation programs on the national ports of developing countries, and on those of Third World Asia particularly, in the next 25 years?

'The short answer is that the processes and principles which have operated to structure the responses of ports to industrialisation in the past will continue, and that the next two or three decades will reveal patterns which are, in principle, similar to those which exist today.

'Most developing countries will seek to maintain viable import-substituting industries and will seek substitutes for high-cost energy imports. But the development model which is most likely to inspire other Asian developing countries is that adopted by the newly industrialised countries — the NICs — and few will not seek to expand their exports of manufactures as well as of raw materials, minerals and part-processed products. The strategy will not be without problems — protectionism and the management of high levels of external debt, for example. National port systems will respond in a number of ways.

'The demands for more efficient shipping of all products will mean the progressive adoption of new shipping technology and new handling methods. Specialised terminals will continue to appear; new container-handling facilities and container terminals will be required for manufactured exports; high levels of capitalisation will continue to characterise major industrial developments so that the characteristics of external capital supplies — strong corporate linkages, often low levels of commitment to development problems, imposition of external control — will continue to shape port/industry patterns in ways similar to those noted above. Where reliance is on domestic capital the development of major industrial complexes is likely to be considerably slowed. Progressive decentralisation of port facilities and port industrial complexes will reduce the dependence on the primate cityport.

'New ports and new industrial complexes will be built in the developing countries of Asia in the next 25 years and there will be increasing awareness of the need to integrate the new developments into overall development strategies. There will be, too, determined efforts to plan and to implement plans more effectively. But for most of the developing countries of Asia, the fine-tuning of policies required to achieve the high level of integration of port and port industrial installations with national urban systems and with programs of regional economic development, though desirable, will be largely unattained.'



Dr Ross Robinson

Robinson joins international group

Dr Robinson also has been invited to join a study team undertaking a major project on Australian-ASEAN shipping. The project is sponsored by the Australian Government in co-operation with the ASEAN governments (Thailand, Singapore, Malaysia, Philippines and Indonesia) and is the first major study of Australian-ASEAN shipping practices and policies undertaken. It is expected that the study will provide an important basis for Australian government policy in respect of shipping and maritime development between Australia and the five countries.

The team comprises maritime economists from Monash University, the Office of the Director General of Transport in Western Australia, the universities in the ASEAN countries. Dr Robinson expects to visit the major ASEAN ports later in the year and will present preliminary findings at a workshop in Singapore in November.

The study will focus especially on the costs of providing shipping services, trade flows and trade development, shipping policies and the development of national shipping lines and services.

Dr Robinson's responsibility relates particularly to the problems of efficient port handling and port development policies, in the ASEAN countries and in Australia.

For Ross Robinson the project represents a continuation of earlier work in the region. In November 1980 he presented a paper on Containerisation in the ASEAN region: a note at the Third Container Technology Conference, London.

Composer appointment

ANDREW FORD, a young composer-painter-conductor has arrived in Wollongong from the United Kingdom to take up an appointment as Lecturer in the School of Creative Arts at the University.

Mr Ford has established a rising reputation among the younger generation of European composers. His works have been presented by some of the leading ensembles in the UK, Holland and the USA. His music is regularly recorded by the BBC. In addition to his work as composer, Mr Ford has founded two important new music ensembles in the UK; Moonflower and Big Bird Theatre. He has conducted this group on tours on the continent of Europe. His work as a painter has achieved much attention during the past two years, and he has given several one-man shows in galleries in the United Kingdom.

His appointment at the School of Creative Arts marks a further step forward by the School, as its new degree schemes come on stream in early 1984. Mr Ford will be setting up a new Contemporary Music Ensemble based on the University, and expects to be able to give concerts with the group in early 1984.

Increasing the degree of tax progressivity in Australia

THE present personal income tax system in Australia is less progressive than it has been in the past; and if it is considered that the present level of progressivity is too low to redistribute as much income as may be desirable under a progressive personal tax then clearly policies to remedy this decline are needed. The decline in progressivity could be partly attributed to the narrow base of the present system which, it has been contended, provides opportunity for tax evasion and avoidance, especially in this country, which has no effective capital gains taxation.

Other factors have contributed to the decline: for example, the reduction in the number of steps in the taxation schedule, the reduced maximum marginal tax rate, the increased minimum marginal tax rate and the concessional rebate scheme and inflation.

These are among the conclusions reached by Terry Alchin of the Department of Economics in The University of Wollongong in a paper entitled *The Decline in Progressivity of Personal Income Tax in Australia.*

Terry Alchin contends: There are ways and means of increasing the degree of progressivity. One would be to increase the number of steps in the tax schedule; another would be to decrease the minimum marginal tax rate; or one might increase the maximum marginal tax rate or reintroduce automatic full tax indexation.

Combinations of these may be most appropriate in today's economic climate. Raising the maximum marginal rate involves the possibility of incentives to evade and avoid tax, and the possibility of disincentives to work, save and invest.

Increasing the number of steps goes against the axiom of 'simplicity' in a tax system. Thus automatic full tax indexation, combined with a reduced minimum tax rate, emerges as the appropriate tax reform policies to increase the level of progressivity of Australian personal income taxation.

Automatic full tax indexation would not allow inflation to dictate the proportion of a taxpayer's income that disappeared as personal income taxation, but the tax scale indexation must be adjusted at least quarterly so as to avoid taxpayers paying more than their share and then having the differential returned at the end of the taxation year.

Full indexation is necessary despite claims that allowance should be made for increased government charges and oil levies.

The reduction in the first marginal tax rate that applied would ensure increased progressivity since the first dollar of income taxed could be at a rate such as, say, four per cent rather than 30 per cent as at present. It does seem ridiculous that while the 4595th dollar one earns as income is 'tax-free' on the 4596th dollar one pays 30 per cent. A lower first marginal tax rate would simplify the system and certainly improve the 'fairness' of the Australian personal income tax system.

Of course, Terry Alchin contends, introducing some form of capital gains taxation on gains similar to income would improve the degree of progressivity, as this is the area in which a great deal of tax is evaded.

It is important to bear in mind that tax *avoidance* is a legalised method of avoiding tax while tax *evasion* is evading a legal requirement to pay tax. It is in this context that Terry Alchin advocates a limited capital gains tax to reduce evasion and avoidance, since the present arbitrary 12-month minimum requirement does not seem to have the effect of reducing quick capital gains.

Girl student — a rugby trainer

Sprinting (page 1) is only one facet of the training program administered to members of the Shellharbour Workers Sharks by third-year student Jenny Asquith, seen here with one of her 'trainees'

A 20-YEAR-OLD GIRL, a third-year student at the University, is the only female in Australia who is independently training *a first-grade rugby team* — the Shellharbour Workers Sharks — to improve their fitness.

Yet the student, Jenny Asquith, is no Amazon. Rather is she something of a dwarf in the company of her proteges, whom she directs with relentless authority through their vigorous training sessions. Jenny employs scientific methods in a professional capacity, which is another unusual feature of her activity. The majority of sportsmen and sportswomen train in the hands of amateurs who in the main are unfamiliar with the current and most effective and safe methods of fitness acquisition.

Jenny is studying Physical Education and Health in her B.Ed course, and it is the training methods learned at the University that she uses to train her 20 footballers. She says: 'I have synthesised concepts developed by sports scientists from England and America, as well as including the principles exposed by my own lecturers.'

Proof of the pudding is in the eating. Jenny's players showed a 33 per cent improvement in fitness (in the areas tested) during their first six-weeks' period in her charge.

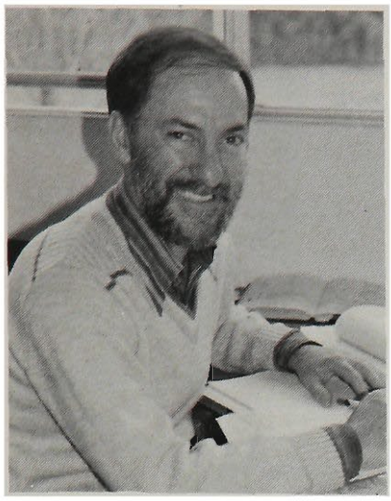
Jenny's program — comprising one-hour training sessions — are supplemented by isometric strengthening and anaerobic interval running. There are eight exercises: stations-stationary sprints, skipping, lateral hip raisers, modified burpees, stair running, push-ups, standing broad jumps and lateral jumps.

After familiarisation with the circuit exercises, the team is tested at each station to determine the number of repetitions that can be achieved in one minute. One minute's recovery is allowed between each effort. The workload then becomes half of the individual's achieved maximum; he thus completes three circuits at half maximum repetition at each exercise. Progression, and therefore evaluation, is recorded on individual cards in terms of decreasing times to complete the circuit and increase repetitions following re-test.

There are, too, trunk tests and sprint training; sprints are short and incorporate dodging, jumping, crawling and running on a curve.

Advantages claimed for Jenny's program are numerous and include the fact that the instructor has personal experience of the program, interest and variety in training stem from the program's scientific formulation, individuals perform at their own rate, and at their own level, and not least because the program is less costly than those offered by many gymnasiums and clubs. Cost is $1 per player per evening session or $20 for the entire team.

Student advice



Tom Moore

Gillian Curtis

Marilyn Johnson

THE STAFF of the Public Relations and Student Attraction Section of the University's Administration is responsible for a number of functions. One of the most significant is the provision of advice to prospective students.

Each year the staff, Tom Moore, Gillian Curtis and Marilyn Johnson, make a large number of school visits during which they speak to senior students on tertiary education generally and The University of Wollongong in particular. This Schools Liaison service has been operating on a full-time basis for almost ten years.

In the past two years the service has been extended as the University has joined in a co-operative venture with Mitchell, Canberra and Riverina Colleges and the Australian National University to visit schools in the south-eastern portion of New South Wales. The venture is designed to minimise disruption to the school program and to present the five institutions as alternatives to the Sydney metropolitan universities and colleges.

In addition to visits to schools the Service performs other activities, e.g., the organisation of an annual Year 12 Introduction Day, the publication of a glossy publication designed to introduce the University in an attractive way, the production of posters for school distribution, the preparation of radio and television advertisements, the maintenance of close relationships with Careers Advisers in schools, and, most importantly, the publication of Undergraduate, Postgraduate and Institute Volumes of the University Calendar.

This year the Service has also produced leaflets giving detailed information on each of the University's undergraduate offerings. These will be sent in bulk to high schools and also to prospective students seeking further details on courses in which they are interested, thus supplementing other sources of information already available.

Tom Moore noted recently that the scope of the Service has been broadened over the years. One significant shift in emphasis relates to the fact that the University now attracts substantial numbers of new students, other than those who proceed directly from school. This 'mature age' group is a varied one and includes those who have had one or two years work experience after leaving school to those who finished their secondary education 20 or more years earlier.

Tom Moore stated that mature-age applicants often seek extended counselling and that long periods of time are spent assisting these potential students choose an appropriate program of study. One development noticeable this year was the number of retrenched workers seeking information on university courses.

Practice teaching in Penang, Malaysia

WHAT has developed in a friendly, professional relationship between the State of Penang Department of Education and the School of Education of The University of Wollongong, began in 1981 when a small group of B.Ed. (Primary) students elected to undertake their practice teaching in Penang, Malaysia.

During the inter-session period this year the group was extended to include B.Ed. (Physical Education/Health) secondary students, and Dip.Ed. students from the Faculties sector.

Some highlights of the first seven days spent in Thailand were the 'culture shock' experienced in Bangkok; the day visit to the 'school over the water' in Phang Na Bay taken by long-tail boats via James Bond Island; teaching Australian children in the Snowy Mountains Engineering Corporation's complex, 20 kilometres from the southern Thailand city of Hadyai; the wonderful hospitality of the Australian and Thai families at the complex.

Our students spent the next 18 days in the relative calm of the island of Penang, staying with Malay, Chinese, and Indian families, and teaching at morning schools or afternoon schools in and around Georgetown. Minor problems there were, but in retrospect they added to the exciting nature of the stay, and challenged the resources of our students who responded, coped, and 'handled the situations' with good sense, humour and responsibility.

The stay in Penang coincided with the end of the fasting month, so a bonus feature was being able to participate in the Hari Raya Puasa, the celebrations of the Moslem new year.

For all of us, the students' foster families, and some close government friends, a dinner party hosted by Professor Rousch provided an opportunity for relaxing, social contact and, in a small way, recognised the efforts of the Director of Education, Tunku Razek, Mansour, our liaison officer, and Dr Lim who had been so helpful.

Four days in Singapore preceded the flight to Sydney, physically concluding the 30 days' venture, but emotionally, professionally and in terms of learning, an experience we will all draw on forever.

friends

Friends Book Fair on October 22 and 23

THE Australian Federation of University Women (a member of the Friends of the University) is organising a book fair in order to raise money for the University.
Donations of books and journals will be gratefully accepted at the Friends of the University Office in the Hut (adjacent to the Administration building) or books may be picked up: telephone (042) 282 955 (day) or (042) 289 558 (evening) for details.

Michael Koder — a tribute

Dr Michael Koder, Deputy Director of the Institute of Advanced Education and Head of the School of Education, has resigned his post with The University of Wollongong. He has accepted the position of Deputy Principal of the Sydney College of Advanced Education. In addition to assisting the Principal in the general administration of the College, Dr Koder's new role will include specific responsibility for academic development including course development and staffing.

The Sydney College of Advanced Education was formed from the amalgamation of inner-city colleges and comprises five semi-autonomous institutes including Sydney Institute, Institute for Early Childhood Studies, Institute of Technical and Adult Teacher Education, St. George Institute and the City Art Institute. It has an enrolment of over 4,400 equivalent full-time students and is located on eight separate teaching campuses, with the administration occupying a further three sites.

Prior to his appointment at Wollongong, Dr Koder was Assistant to the Principal at the Milperra College of Advanced Education, having held the position of Principal Lecturer and Head of the Department of Education Studies there. He was appointed Deputy Director of the Wollongong Institute of Education in April 1979, responsible for the oversight and development of academic programs at the Institute. Since his appointment, the Institute undertook major review of its programs which led to the successful development of Bachelor of Education courses in Primary Education, Secondary Mathematics Education and Secondary English/History Education.

Michael Koder

This development provided Faculty and Institute students with the opportunity to undertake a common first-year subject in Education. In addition, several graduate diplomas in educational studies, including Environmental Education, Health Education, Reading/English as a Second Language Education and Computers in Education, were introduced. As part of this responsibility, Dr Koder co-ordinated the development of the current Associate Diploma in the Arts and guided early submissions for the Associate Diploma in Industrial Studies. He co-ordinated, too, the Institute's academic contribution to basic nurse education programs offered by the Illawarra School of Nursing and acted as a curriculum consultant in the development of Stage III documentation for a certificate-level course in basic nursing and an associate diploma and a diploma level course in Health Science (Basic Nursing).

During 1980 and 1981 the Institute moved from a single-purpose to a multi-purpose status and within this context Dr Koder accepted the role of Head of School of Education in addition to his duties as Deputy Director. He has published articles in the field of teacher education and educational administration, given numerous conference papers and acted as a consultant in the fields of teacher education and educational administration.

Dr Koder was a member of the Institute Council until it was dissolved and, following amalgamation, served on the Council of the University for a period of six months. He has contributed to several academic committees throughout the University, including the Planning and Development Committee, Recurrent Resources Committee, the Academic Board and the Academic Senate. Dr Koder has been a member of numerous accreditation committees for courses offered by other institutions and is current member of the Higher Education Board panel of accreditation chairpersons.

The School of Education of the Institute sector and the Department of Education of the Faculty sector have, in recent months, engaged in discussion on the development of closer working relationships with a view to eventual amalgamation. Dr Koder's departure will result in a re-evaluation of senior academic positions in education within the Institute which may have a significant bearing on future structures in education within the University.

Edward Cowie makes flying start

WITHIN five months of arrival in Wollongong, Edward Cowie, Head of the School of Creative Arts, has already given a major concert as Conductor with the Seymour Group in Sydney, at which the first Australian performance took place of his *Commedia Lazzis* for solo guitar.

Professor Cowie is to attend the world premiere of his massive Choral Symphony at the Leeds Festival in the United Kingdom. The orchestra will be the Royal Liverpool Philharmonic Orchestra under the baton of Howard Williams, who was to give the first London performance of Cowie's Concerto for Orchestra in the BBC Promenade Concerts in the Royal Albert Hall in September.

During November, the Royal Liverpool Philharmonic Orchestra will record Professor Cowie's Concerto for Hyperion Records, coupled with his Clarinet Concerto. Also in November, the BBC Northern Singers will give the World Premiere of Kelly Choruses which Edward Cowie began to compose during his first visit to Australia in 1981.

Next year promises to be busy too. January sees the world premiere of the Harp Concerto, commissioned by Tyne-Tees TV for the Northern Sinfonia. Liverpool mounts a major Cowie-Festival at the end of the month at which many of Cowie's major works will be presented. This will include the world premiere of Cowie's Symphony No. 1 ('The American'), a Missa Brevis for the Metropolitan Cathedral, Liverpool, and further performances of the Kate Kelly Road Show, given its world premiere at the Chester Festival to rave reviews in July of this year. Exhibitions of Cowie's paintings appear in one-man shows at the Leeds Festival in October, and the Liverpool Festival in January 1984.

On Edward Cowie's return to Australia, plans are advanced for him to feature in the Adelaide Festival, where he will conduct and mount an exhibiton of recent Australian paintings. He is to visit Hobart, Tasmania, for a Festival of his music towards the middle of 1984.

New works in hand by Professor Cowie are the Third String Quartet, newly commissioned by the Tasmanian-based Petra Quartet, a ballet for the Australian Dance Company in Adelaide and, of course, work on the opera Ned Kelly for the Royal Opera House, Covent Garden.

Edward Cowie has also been invited to produce some radio programmes for ABC FM in 1984. He completes work on a new television film on Leonardo da Vinci for BBC TV2 at the close of this year, and will be involved in the making of a series of TV films for ABC TV 'Big Country' series in 1984.